

CLAIMS

What is claimed is:

1. A twist drill comprising:
a cutting tip including a front flank face, a substantially cylindrical tool body
extending rearwardly from the cutting tip, and a shank;
the tool body having a rotational axis therethrough and including at least one
5 flute formed on an outer peripheral surface thereof and extending to the front flank
face;
wherein the at least one flute includes a first helical portion opening to the
front flank face and a second helical portion extending from the rear end of the first
helical portion toward the rear portion of the tool body, wherein the second helical
10 portion twists in a direction opposite of the first helical portion.
2. The twist drill of claim 1 wherein the first helical portion is positioned
in a positive helix.
3. The twist drill of claim 1 wherein the cutting tip is an interchangeable
cutting tip.
4. The twist drill of claim 1 wherein the cutting tip includes an S-shaped
chisel edge.
5. The twist drill of claim 1 wherein the tool body is made of steel.
6. The twist drill of claim 1 wherein the tool body is made of cemented
carbide.
7. The twist drill of claim 1 wherein the tool body includes a pair of
helical flutes formed in a peripheral outer surface of the tool body.
8. The twist drill of claim 7 wherein the helix angle of the first helical
portion is maintained constant from the cutting tip to the tool body and on a portion of
the flutes in the tool body.

9. The twist drill of claim 1 wherein the twist drill includes at least one coolant hole.
10. The twist drill of claim 1 wherein the helix angle of the first helical portion is about 0 to about 40 degrees.
11. The twist drill of claim 10 wherein the helix angle of the first helical portion is about 30 degrees.
12. The twist drill of claim 1 wherein the helix angle of the second helical portion is from about 1 to about 30 degrees.
13. The twist drill of claim 12 wherein the helix angle of the second helical portion is about 3 degrees.
14. The twist drill of claim 1 further comprising a third helical portion extending from the rear of the second helical portion.
15. The twist drill of claim 14 wherein the third helical portion twists in a direction opposite of the second helical portion.
16. The twist drill of claim 15 wherein the third helical portion extends from the rear of the second helical portion to the shank of the drill.
17. The twist drill of claim 14 wherein the helix angle of the third helical portion is constant.
18. The twist drill of claim 14 wherein the helix angle of the third helical portion is from about 0 to about 40 degrees.
19. The twist drill of claim 14 wherein the helix angle of the third helical portion is about 5 degrees.
20. The twist drill of claim 1 wherein the twist drill has web thickness that is constant along the length of the twist drill.

21. The twist drill of claim 1 wherein the twist drill has a web thickness that is tapered along the length of the twist drill.

22. The twist drill of claim 1 wherein the twist drill has a web thickness that varies along the longitudinal length of the twist drill.